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## Geriatric Urinary Incontinence – Special Concerns on the Frail Elderly

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### 1. Introduction

Since the last decades, the elderly population is growing significantly and the projection for the next 20-25 years is that the range of over 80 is increasing. Frailty is accepted as a syndrome of late-life decline and vulnerability that serves as a warning sign for adverse health outcomes and for mortality. The identification of vulnerable, frail, adults may allow the development of preventive interventions which help to maintain good health and high quality of life well into the 8th and 9th decade of life.

Urinary incontinence (UI) is considered one of the main giants of Geriatrics, described by Sir Bernard Isaacs in 1976, and it has also included in the list of the Geriatric syndromes. The combination of a frail elderly and UI could be very negative due to its adverse effects both in terms of health as well as on quality of life.

Nowadays, the appropriate extent of diagnostic process in the elderly incontinent is not well established. In general, healthy older patients should receive the same diagnostic scheme as younger patients. By contrast, in frail older people an individual assessment is mandatory in order to decide the step of our diagnostic intervention. In the same way, the medical management of the younger elderly patients should be very similar to the young patients. But, the frailest elderly patients should be managed individually, adapting the different levels of intervention to the complexity of the frail elderly.

As a matter of fact, the appropriate knowledge of older population, the level of vulnerability and their true possibilities of improve with our intervention is very important to decide the best way of treating this syndrome in the frailest population.

### 2. Frailty: Current definition and main characteristics of the frail elderly

The concept of frailty as a specific syndrome has based on the clinical experience of geriatricians and usually is clinically well recognizable. Usually it is characterized by weakness, weight loss, and low activity and is associated with adverse health outcomes (including falls, incident disability, hospitalization, and mortality) (Xue, 2011; Fedarco, 2011).

Frailty is a non-specific state of vulnerability, which reflects multisystem physiological change. These changes do not always mean a disease status, so some very elderly, are frail without a specific life threatening illness. Current thinking is that, not only the physical way contributes to this syndrome, because also psychological, cognitive, and social factors take a decisive role and need to be taken into account in its definition and treatment.

Together, these signs and symptoms seem to reflect a reduced functional reserve and consequent decrease in adaptation to different type of stressors, and perhaps even in the absence of extrinsic stressors. The overall consequence is that frail elderly are at higher risk for accelerated physical and cognitive decline, disability and death. All these frailty's characteristics can easily be applied to the definition and characterization of the aging process per se, and there is little consensus in the literature concerning the physiological/biological pathways associated with or determining frailty. It is probably true to say that a consensus view would implicate heightened chronic systemic inflammation as a major contributor to frailty (Fulop et al, 2011).

Many other authors have focused on the popular definition proposed and tested in the Cardiovascular Health Study in the United States and known as the phenotypic definition of frailty. That study defined frailty by the occurrence of at least 3 of the following 5 deficits in an individual: slow walking speed, impaired grip strength, a self-report of declining activity levels, unintended weight loss, or exhaustion. In addition to the phenotypic and other approaches, frailty is considered as a risk state caused by the age-associated accumulation of deficits (Rockwood & Mitnitski, 2011).

The frailty can be considered as a complex phenomenon, with multiple links and interactions between the clinical, functional, mental and social components. In this sense, the use of the Geriatric Comprehensive Assessment (GCA) could be very useful in the detection of the frail condition of an older people. Through assessment of general health (comorbidity), function, cognition, mood and motivation, the special senses, nutrition and medications, this tool facilitates identification of health issues and the appropriate intervention and follow-up for them. As part of a comprehensive management plan, CGA also supports continued independence and improved quality of life for an individual in association with reduced medical costs (Rockwood & Mitnitski, 2011; Rosen & Reuben, 2011).

Based on these concepts, a frail elderly would be a very old person (usually more than 80-85 years), with high comorbidity, functional handicaps, cognitive impairment and also limitations in the familiar and social areas. In this group of older persons, it is expected the highest known prevalence of UI of any group of age (around 50-70%).

In frail elderly, UI constitutes a syndromic model with multiple interacting risk factors, such as age-related physiologic changes, comorbidity, and common pathways between them, in which the accumulated effects of multiple impairments increase vulnerability to situational changes (Inouye et al, 2007).

### **3. Aging of the urinary tract – Role of the comorbidity and the polypharmacy**

With aging, the lower urinary tract undergoes to a series of morphological and/or functional changes that can lead to a different dynamic behaviour and the possibility of

alterations in urine storage and bladder emptying functions. These functions as well as urinary continence are maintained due to the integrity of the lower urinary tract, the nervous system, the visceral supporting mechanism (pelvic floor) and the urine production mechanism. There must also be adequate perception and interpretation of the urge to pass urine, as well as the physical capacity to go to the toilet and to perform the activity.

The most relevant changes of lower urinary tract with aging are listed in Table 1.

<u>Bladder</u>	<u>Morphologic changes:</u> ↑ trabeculation ↑ fibrosis ↓ autonomic nerves Diverticula’s formation <u>Functional changes:</u> ↓ capacity ↓ ability to put off micturition = ↓ contractility ↑ involuntary contractions ↑ post voiding residual volume
<u>Urethra</u>	<u>Anatomical changes:</u> ↓ cellularity ↑ collagen deposit <u>Functional changes:</u> ↓ closure pressure ↓ outflow resistance
<u>Prostate</u>	Enlargement, hyperplasia
<u>Vagina</u>	↓ cellularity epithelium atrophy
<u>Pelvic floor</u>	↑ collagen deposit ↑ connective tissue ratio Muscle weakness

Table 1. Lower urinary tract: main physiological changes with aging

In general, it is accepted that detrusor muscle contractility, bladder capacity and ability to put off micturition decrease in both sexes with aging. In addition, the prevalence of bladder hyperactivity increases. In women the maximum pressure of urethral closure and length of the functional urethra decreases, and post-micturition bladder residual volume increases up to 50-100 ml. Physiologically, elderly people tend to excrete more urine at night, even when there are no exacerbating factors such as heart failure, venous insufficiency, renal disease or prostatism. In men the prostate increases in volume meanwhile hypoestrogenism in women affects both the genital apparatus and urinary tract. Thus, the healthy elderly individual is much more vulnerable to suffering urinary pathological processes such as incontinence, infections, urinary retention and outflow obstruction (Verdejo, 2000).

Since the last 10-12 years, the role played by the pelvic floor in micturition dynamics and especially in the maintenance of continence has been increasingly recognised. The age related deterioration in pelvic floor functions has a multifactorial origin (physiological and pathological). With increasing age, a reduction in the muscle fibre/connective tissue ratio has been demonstrated and the connective tissue becomes more elastic with less energy needed to provoke an irreversible lesion. Some of these changes have also been described in multiparous women and in those with pelvic prolapse. As well as oestrogen deficit, other factors contributing to the deterioration of the pelvic floor include mechanical trauma, and neurological denervation. These mechanisms can modify the normal angulation of the posterior wall of the bladder and the proximal urethra, leading to stress incontinence (Verdejo, 2000; Cheng, 2007).

In fact, physiologically, the frail elderly has a high risk to suffer the loss of continence. However, the physiological circumstances of aging, the multiple diseases characteristic of the frail elderly (dementia, motor disorders, cerebrovascular disease, Parkinson’s disease, malnutrition), functional deterioration (immobility, dementia) drug treatment (diuretics, psychotropic agents, anticholinergics) (Ruby CM et al, 2010) and even iatrogenic factors (catheterization, physical restriction, adverse reactions) are going to have a significant influence on the function of the lower urinary tract (Verdejo, 2004; DuBeau, 2006).

Nowadays, it is accepted that greater responsibility is given to comorbidity, functional impairment (physical and / or mental) and polypharmacy to justify the prevalence of incontinence in the frailest elderly. Table 2 presents the main medical problems more frequently associated with incontinence in the frail elderly.

Comorbidity	<ul style="list-style-type: none"><li>* Neurological diseases: Stroke; Dementias; Parkinson’s disease; spinal cord injury; autonomic and peripheral disautonomies</li><li>* Endocrine diseases: Diabetes Mellitus</li><li>* Cardiac diseases: Heart failure</li><li>* Urological diseases: Benign Prostatic Hyperplasia; Infections; Neoplasms; Lithiasis; Prior Surgery.</li><li>* Digestive diseases: chronic constipation; fecal impaction.</li><li>* Gynaecological pathologies: pelvic floor damage; prolapses; prior surgery</li></ul>
Functional impairment	<ul style="list-style-type: none"><li>- Cognitive impairment; Dementia</li><li>- Poor mobility; Immobility</li><li>- Dependence on ADL’s</li></ul>

Table 2. Main medical and functional conditions associated with UI in the frail elderly.

However, it is very important to highlight that the pharmacologic treatment play a significant etiologic role in the loss of urinary continence, especially in the frail elderly, and it could be related to different mechanisms. Table 3 presents the main drug groups, along with its mechanism of action, most often associated with loss of continence or worsening the symptoms of incontinence.

MEDICATIONS	EFFECTS ON CONTINENCE
Diuretics	Polyuria, urgency, frequency
Hypnotics	Sedation, impaired mobility, delirium
Antipsychotics	Sedation, impaired mobility, parkinsonism, delirium
Anticholinergics	Delirium, stool impaction, urinary retention
Triciclic Antidepressants	Sedation, anticholinergic effect
Opioid analgesics	Immobility, stool impaction, delirium, urinary retention
Cholinesterase inhibitors	Increase bladder contractility, urgency
Selective Serotonin Reuptake Inhibitor	Stimulation of cholinergic bladder receptors, sedation
α-adrenergic antagonists	Decrease urethral resistance
Angiotensin Converting Enzyme inhibitors	Cough
Calcium antagonists	Constipation, stool impaction, urinary retention

Table 3. Main drugs that can be associated with UI, with their mechanism of action

4. Geriatric urinary incontinence – Main clinical types in the frail population

There are several types of UI in the frail elderly population, and more frequently than other age groups, it could presents in a mixed form (urge + stress; detrusor hyperactivity with impaired contractility).

A practical and useful approach to the frailest incontinent patient is based on its duration (acute or chronic).

4.1 Acute or transient incontinence

Acute or transient incontinence it refers to cases of short course incontinence (lasting less than four weeks), including those situations in which loss of continence is considered to be functional, without any associated structural disorder. This clinical type of UI is very common in the frail elderly, especially in the more complex elderly and with higher disability. In these cases, the medical history and physical examination will often suggest the cause. The use of mnemonic rules (DRIP or DIAPPERS), has been proposed in order to memorize the possible causes (Schröder et al, 2009; Griebling, 2009). (Table 4).

D Delirium	D Delirium/Dementia
Dementia	I Infection
R Restricted Mobility	A Atrophic vaginitis
Retention	P Pharmaceutical agents
I Infection	P Psychological causes
Inflammation	E Endocrine conditions
Impaction Stool	R Restricted mobility
P Pharmaceutical agents	S Stool impaction
Polyuria	

Table 4. Transient causes of urinary incontinence, based on mnemonic rules



## 4.2 Chronic or established incontinence

Chronic or established incontinence: it is associated with structural disorders, either in the urinary tract or outside of it, like in the nervous system. Usually the duration of this type of incontinence is over four weeks and some complementary examinations (ultrasounds, urodynamic) will be required to discover its etiology. It is important to emphasize that some transient causes of incontinence may contribute to an established form and that mixed incontinence is more common in the frail elderly population than in other groups of patients.

Mechanisms that are responsible for greater frequency of established incontinence in elderly people are:

### 4.2.1 Urge incontinence

Urge incontinence: this is the most common type of established incontinence in the older population. Usually underlies detrusor hyperactivity in relationship with several neurological diseases (brain ischemia, dementias, Parkinson's disease). Clinically, this type of UI presents as urgency, frequency and nocturia, and it has a higher impact on quality of life due to the bothersome and the severity of the symptoms.

### 4.2.2 Stress incontinence

Stress incontinence: this is most common in frail elderly women and uncommon in men, except when the external urethral sphincter has been damaged during prostatic surgery. The causes are generally related to pelvic floor weakness which produces a urethral hypermobility (multiparity, hypoestrogenism, obesity) or previous pelvic surgery (gynaecological, prostatic resection). The urine leakages will be produced with manoeuvres that cause an increase in intra-abdominal pressure (coughing, laughing, sneezing, Valsalva). Usually the length of the symptoms is long, and the impact on quality of life is lower than urge incontinence.

### 4.2.3 Overflow incontinence

Overflow incontinence: this appears in situations of bladder overdistension. There are two different mechanisms: bladder outlet obstruction (prostatic hyperplasia, urethral stenosis, faecal impaction) and bladder contractile impairment (spinal cord lesions, peripheral and/or autonomic neuropathy, detrusor myopathy, anticholinergic drugs). Within this subgroup of incontinence, a relatively common entity exists, especially in disabled patients, called Detrusor Hyperactivity with Impaired Contractility (DHIC). This term was coined by Resnick in 1987 when he observed a characteristic urodynamic pattern, in an incontinent and disabled elderly group, of uninhibited bladder contractions together with an inability to empty more than 50% of the bladder content (Resnick, 1996). Nowadays, DHIC is considered a subtype of bladder hyperreflexia, but the mechanism that produces bladder contractile impairment is unknown. It is proposed that it may be an evolved phase of bladder hyperreflexia, with the production of muscle failure (Smith PP, 2010). From the clinical point of view, patients may present with both irritative type urinary symptoms

(urge, frequency), as well as obstructive type (incomplete voiding, urinary retention). Characteristically, post-voiding residual urine volumes are pathological. Although DHIC generally presents with urge incontinence, it may also manifest with symptoms of obstruction, stress or overflow incontinence. This form of bladder hyperactivity is the second commonest cause of incontinence in institutionalized patients. An episode of urinary retention may occur when some other factor (drugs, immobility, and fecal impaction) further alters bladder contractility (Verdejo, 2004).

#### **4.2.4 Functional incontinence**

Functional incontinence: many social and environmental factors, such as lack of carers to assist with toileting, and physical barriers, including bed-restraints, may be responsible for incontinence. However, a diagnosis of functional incontinence should only be accepted by exclusion, once other mechanisms have been ruled out.

#### **4.2.5 Mixed incontinence**

Mixed incontinence: many frail older people with chronic incontinence have a combination of different type of incontinence. A combination of urge incontinence and stress is very common. Another type of specific mixed incontinence in the frail elderly is the DHIC as previously has been exposed above.

### **5. Risks factors of the UI in the frail elderly**

From the reports of the main epidemiological studies there have been identified several potential risk factors for UI depending of the characteristics of adult populations. However, the majority of studies have been cross-sectional in design which provides data only on risk factors for prevalent incontinence. Many of these studies are national population-based surveys on the general health of a particular population, and they are limited by the variables included in the study. Longitudinal studies incorporating multivariate analyses that provide data on the risk factors for incident incontinence are scarce. So, the data from studies which included frail population are very few.

In older women, modifiable risk factors included obesity, vaginal trauma, and vaginal prolapse. In general, the risk factors for the various types of UI (stress, urge, and mixed) also vary. Aging tends to be associated with changing risk profiles associated with UI and urge incontinence type. With limited evidence (level IIA from prospective cohort studies), appears that increased body mass index, diabetes mellitus, comorbidities, cognitive decline, and hormone therapy were associated with developing UI in community dwelling females. In men, consistent published evidence (level IIB-III) suggested that poor general health, limitation in daily activities, stroke, diabetes mellitus, and treatments for prostate cancer (mainly surgery) were associated with higher risk of UI in older men (Shamliyan et al, 2007).

Through the analysis of the studies performed in long term care (nursing homes), we know that the prevalence of UI increased with the length of stay, since 39 percent at 2 weeks to 44 percent at 1 year after admission. In that way, the majority of residents with cognitive



impairment experienced UI (72 to 84 percent), and the proportion of incontinent patients increased significantly in relationship with the severity of impairment (from 60 percent in mild to 93 percent in severely demented). Physical dependency was associated with a higher prevalence of UI, from 26 percent in independent residents to 81 percent in disabled older patients (Shamliyan et al, 2007). However, few studies examined adjusted odds ratios of UI among residents in long term care independent of other confounding factors. Aging was associated with increased odds of UI by 3 percent per year to 24 percent per 5 years of age (Shamliyan et al, 2007; Offermans et al, 2009).

In addition of the medical conditions, it is very important to highlight the role of the drugs that frequently received the older patients, on the urinary continence, as previously exposed above.

In summary, a poor health status with medical problems especially in the neurological area, a high consumption of drugs (diuretics, psychotropics) and a limited functional status are main risks factors for loss of the continence in the frail elderly population.

## **6. Impact of urinary incontinence on the quality of life and its assessment**

UI produces a wide variety of negative effects on quality of life (QOL) for patients, from medical problems (falls, urinary tract infections, pressure sores, skin's complications, kidney failure, functional decline) to psychological (anxiety, depressive symptoms, insomnia, sadness, loneliness) or social limitations (social isolation, impact on ADL, need of social resources, nursing home admission). It is considered that impact on QOL is similar as produced by Diabetes Mellitus, Stroke or Arthritis (Ko et al, 2005). The patient's perception of the impact of their UI on their lifestyle is very important, and even mild UI has a significant on a patient's QOL, including the frailest population.

Since the last 10 years, the proposal from the International Continence Society and the World Health Organization is assessing the impact of urinary symptoms have on QOL. In fact, clinicians should be aware of it and they should take consideration of the adverse effects that even mild UI has on a patient's QOL. The urinary symptoms and their impact on patient's QOL can be assessed through different ways, but only the objective assessment based on validated questionnaires is the right form (Scottish Intercollegiate Guidelines Network, 2004).

The questionnaires have been validated for measuring the severity of the symptoms and also the impact on QOL. Patterns have been developed to analyze mainly urinary symptoms and other models to know the impact on QOL. Through the urinary questionnaires we can evaluate initial symptoms as well as impact on QOL, and the further modification of the urinary symptoms and their impact on QOL with our intervention.

A list of principal urinary questionnaires is presented in the table 5, and the main combined questionnaires (urinary and QOL) in the table 6.

One of the most practical questionnaires is the Short Form of the International Consultation Incontinence (table 7), which has been validated and translated to 30 languages, and has a high level of recommendation (grade A) by the International Continence Society (Gotoh, 2007).

Urogenital Distress Inventory (UDI)
UDI-SF
Urge UDI
King’s Health Questionnaire
Incontinence Severity Index (women)
International Continence Society (men)
International Continence Society male –SF
Bristol Female Lower Urinary Tract Symptoms
Danish Prostatic Symptom Score (men)

Table 5. Principal urinary questionnaires of incontinence

International Consultation on Incontinence Questionnaire (ICIQ) (men and women)
Bristol Female Lower Urinary Tract Symptoms
International Continence Society SF (men)
The Sickness Impact Profile (women)
The Quality of Life of persons with Urinary Incontinence (I-QOL) (men and women)
The Incontinence Impact Questionnaire (women)
The Urogenital Distress Inventory (women)

Table 6. Main combined urinary questionnaires (incontinence and impact on QOL)

ICIQ-SF

Initial number

DAYMONTHYEAR

Today's date

Many people leak urine some of the time. We are trying to find out how many people leak urine, and how much this bothers them. We would be grateful if you could answer the following questions, thinking about how you have been, on average, over the PAST FOUR WEEKS.

1

Please write in your date of birth:

DAYMONTHYEAR

2

Are you (tick one):

Female

Male

3

How often do you leak urine? (Tick one box)

never

0

about once a week or less often

1

two or three times a week

2

about once a day

3

several times a day

4

all the time

5

4

We would like to know how much urine you think leaks.  
How much urine do you usually leak (whether you wear protection or not)? (Tick one box)

none

0

a small amount

2

a moderate amount

4

a large amount

6

5

Overall, how much does leaking urine interfere with your everyday life?  
Please ring a number between 0 (not at all) and 10 (a great deal)

0

1

2

3

4

5

6

7

8

9

10

not at all

a great deal

ICIQ score: sum scores 3+4+5

6

When does urine leak? (Please tick all that apply to you)

never – urine does not leak

leaks before you can get to the toilet

leaks when you cough or sneeze

leaks when you are asleep

leaks when you are physically active/exercising

leaks when you have finished urinating and are dressed

leaks for no obvious reason

leaks all the time

Thank you very much for answering these questions.

Table 7. The International Consultation on Incontinence Questionnaire Short Form

## 7. Clinical approach of the urinary incontinence in the frail elderly

Nowadays, there are several evidences about the need of the early detection of UI in older persons, especially in the frail elderly, due to the low index consultation (about 30-50 % of patients), as well as the number of elderly people that received an effective treatment, in spite of the valid alternatives. In this sense, the Assessing Care of Vulnerable Elders, the Fourth Consultation on Incontinence, and the Guidelines on UI recently published by the European Association of Urology recommends its assessment (Grade A) (DuBeau et al, 2010).

It is very important to highlight that the extent of the clinical approach and the diagnostic process in the frail elderly incontinent is not well established. In general, healthy older persons should receive the same diagnostic schedule as younger patients. By contrast, in frail older persons an individual assessment is required, and it should include: medical and functional status; the incontinence's impact; the preferences of the patient; the life's expectancy and also the true chances to improve after a wide evaluation.

Currently, it is accepted that the clinical assessment of the elderly incontinent has two different steps, one basic and another further.

### 7.1 Basic step

Basic step the basic step should be done in every incontinent patient and the general practitioner can successfully do it, with several main objectives: to detect transient causes of incontinence; to exclude serious underlying diseases; to identify patients who need further evaluation and finally to decide the appropriate treatment.

Basic step has included different components of the clinical assessment, all of them very important to know the characteristics of the incontinent frail elderly.

Basic step should include:

#### 7.1.1 Medical history

Medical history with the follow components (Abrams et al, 2010):

- A list of co-morbid conditions (neurological, cardiac, endocrine or musculoskeletal diseases, sensorial deficits) as well as the previous surgery (hysterectomy, prostatectomy), in order to detect the main risk factors for the incontinence. Also is very important to know the bowel symptoms (constipation, previous stool impaction, faecal incontinence), as well as the fluid intake (volume and the consumption of tea, coffee, alcoholic drinks).
- A review of the pharmacological treatment in order to check the use of drugs with negative effects on continence (diuretics, psychotropics)
- A practical functional evaluation (especially transfers, mobility, ability to use toilet, cognition).
- A focused urinary history assessing the onset and the length of the incontinence, and also the presence of storage symptoms (frequency, urgency, nocturia) or voiding symptoms (poor urinary stream, hesitancy) as well as the precipitants of urinary leakages (cough, exertion). In order to facilitate the assessment of the urinary symptoms, could be very practical the use of the voiding diaries, which are considered as a useful instrument in the

clinical evaluation. The information can be obtained from the patient or caregiver, and in the majority of the cases, probably a three day diary is usually sufficient. It is important to comment that in cases of high frailty, cognitive impairment or mental problems, we can use a register of the leakages and their amounts instead a formal diary. The level of recommendation of the voiding diaries is grade A.

- The impact on QOL: this area is considered very important, and the assessment should be done through a formal instrument such a valid questionnaire (as it has described above).
- The social and environmental factors: such as the access to toilets, the availability of aids.

### 7.1.2 Physical examination

The physical examination should include an abdominal (for excluding a distended bladder or a pelvic mass), rectal (for evaluating the sphincter tone, the prostate size, the presence of impaction faecal) a basic neurological exam (especially gait and signs of focal lesions), a genital and pelvic examinations (cough stress test, prolapse evaluation).

The International Continence Society recommends also a post-void residual volume (PVR) measurement by a non-invasive method before to start medical or surgical treatment (Grade C of recommendation), although there are no evidence-based criteria for a high volume (DuBeau et al, 2010; Abrams et al, Markland et al, 2011). In general, PVR greater than 150-200 ml is considered significant in frail older patients.

### 7.1.3 Basic investigations

Urine analysis should be done in all the incontinent frail patients, and it can be very useful to detect or rule out infection or hematuria. Although, -results should be interpreted with caution due to the high percentage of asymptomatic bacteriuria in the older population (at least 20%). So, it is necessary to be sure of the relation between an abnormal urine analysis and the urinary symptoms (urgency, frequency, dysuria), in order to accept the clinical diagnosis of urinary infection instead of asymptomatic bacteriuria.

Other laboratory tests (thyroid hormones, vitamin B12 or vitamin D levels) require an individualized justification.

### 7.2 Further step

Further step based on the findings of the basic approach we could detect some frail elderly who require further evaluation by different team of specialists (urologist, gynaecologist) or making certain techniques (ultrasounds, urodynamics) to complete the diagnostic process and provide the therapeutic alternatives.

In the table 8 are exposed the main criteria to refer a frail elderly to the specialist.

## 8. Diagnostic approach of the urinary incontinence in the frail elderly

In most frail older patients with incontinence, non-invasive diagnostic evaluation can be successfully done, and it will help to decide the conservative management of the patient. As previous mentioned, on the basis of basic step with its components (medical, pharmaceutical, functional, urinary diary, questionnaire of QOL, and a physical

<ul style="list-style-type: none"><li>- Surgery or irradiation involving the pelvic area</li><li>- Two or more urinary tract infections in a one-year period</li><li>- Incontinence with new-onset neurologic symptoms</li><li>- Pelvic pain associated with incontinence</li><li>- Marked pelvic prolapse on physical examination</li><li>- Difficulty passing a 14-Fr straight urinary catheter</li><li>- Post-void residual volume &gt; 200 ml</li><li>- Abnormal prostate examination on digital rectal</li><li>- Asymptomatic microscopic or macroscopic hematuria</li><li>- Before a surgical procedure to repair urinary incontinence</li><li>- Persistent bothersome symptoms after adequate trials of behavioural or drug therapy</li></ul>
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Table 8. Main criteria to refer a frail elderly for specialty evaluation

examination) we are able to distinguish between an acute cause or a chronic cause of incontinence, to detect the great majority of the transient causes, the main risks factors for incontinence and to recognize the clinical type of UI and its main symptoms. With this information would be possible to decide the plan of treatment and the follow-up of the older patients with incontinence.

If the basic step does not drive the physician to a conclusive diagnosis of UI type, or in cases that conservative management of the frail older patients has failed, more extensive or invasive diagnostic techniques should be planed individually. In some cases, could be necessary to practice several complementary techniques in order to discover the etiologic mechanism of the incontinence and also the status of the upper urinary tract.

The gold standard technique in diagnosis of established incontinence is Urodynamics, allowing demonstrate whether an underlying abnormality of storage or voiding is present. Nowadays, this technique is not appropriate for all older patients, and usually it is reserved for selected patients (Thirugnanasothy, 2010). Probably, the main recommendations for this technique in the frail elderly population, is the demonstration of a significant PVR and before planning a surgical procedure to repair urinary incontinence (Verdejo, 2011).

Based on the results of these techniques, especially on Urodynamics, we can obtain definitive diagnosis of UI type and organize better the complete and multidimensional plan of treatment.

9. Medical treatment of the urinary incontinence in the frail elderly

In order to decide treatment scheme, we should establish a comprehensive individualized plan of treatment, based on: the patient’s characteristics (comorbidity and level of disability); the type of incontinence (urgency, at cough, mixed, overflow); the impact of incontinence; the patient’s preferences and level of co-operation; the need of help by others; and also true chances of adherence to treatment (Schröder et al, 2009; Abrams et al; 2010).

It is very important to underline that the main objectives of our intervention should be: firstly, to improve the QOL; secondly, the reduction of the severity / number of leakages; and finally, if possible, the recovery of continence. In fact, the individual scheme of treatment has to be very realistic and adapted to the characteristics of each frail patient,



looking more for quality of life instead of the cure of medical problem. Unfortunately, in some patients with immobility or severe dementia, the only alternative could be the use of palliative aids and general care.

### 9.1 Conservative management

Nowadays, the conservative treatment of UI is considered as the mainstay in its management (grade A of recommendation). There are several effective interventions such as: modification of fluid intake pattern; modification of drug treatments; type of clothes used; palliative aids; environmental manipulations; detection and correction of transient causes (especially delirium in the frailest population); and the use of behavioural procedures (Wyman et al, 2009; Imamura et al, 2010; Abrams et al, 2010; DuBeau et al, 2010).

Behavioural techniques have been demonstrated to be an effective tool in the management of several types of incontinence in the elderly. The technique used depends on the individual's functional and cognitive state. In general, if the patient doesn't have cognitive impairment, pelvic floor muscle exercises and bladder training can be used successfully. For patients with cognitive impairment, the best alternative is prompted voiding (Level 1 of evidence) (Markland et al, 2011).

It is very important to highlight that all of these techniques have shown to reduce the severity of urgency and stress incontinence (grade A of recommendation) (Burgio, 2009; Price et al, 2010). In cases of institutionalized older patients and cognitively impaired, scheduled and prompted voiding have demonstrated to reduce the number of leakages of urine and the severity of the incontinence. However, these techniques require many caregivers and staff in nursing home, so it is not always possible to use them in the disabled and frailest elderly patients (Thum & Wagg, 2009).

### 9.2 Pharmacologic management

Moreover of these general interventions, there are several effective pharmacological agents such as antimuscarinics, serotonin and noradrenaline re-uptake inhibitor (SNRI) e.g. Duloxetine or anti-diuretic hormones e.g. Desmopressin.

#### 9.2.1 Antimuscarinic drugs

At the present time, there are several available antimuscarinic drugs with a different profile based on the ability to block the muscarinic receptors. Moreover, we have to choose the antimuscarinic drug based on the safety profile. All the antimuscarinic drugs have been widely tested in randomised controlled trials and demonstrate to produce a positive effect in the treatment of urge and mixed incontinence, with about 50% reduction of leakages compared with placebo (Thirugnanasothy, 2010). According to the results of many trials of the incontinent frail elderly population, the overall efficacies of the different antimuscarinic drugs are similar, and so the initial choice of this agent should be based on its safety profile. If one antimuscarinic agent doesn't provide satisfactory relief of symptoms, an alternative antimuscarinic should be tried.

In some cases, we could decide to use antimuscarinics drugs based only on clinical symptoms (frequency, urgency, and nocturia), and also on the severity of leakages



(moderate or severe), but with several requisites: the physical examination and the lab tests have to be normal. In this sense, the theoretical side effects on cognitive function must not limit its use in the elderly (Wagg et al, 2010). Furthermore, in all the cases, we must analyze the individual risks of this treatment with a close follow-up of the frailest older patients.

Table 9 shows a list of drugs with antimuscarinic action most commonly used in the treatment of incontinent frail older patients, with their level of evidence and grade of recommendation (Schröder et al, 2009; DuBeau et al, 2010).

DRUG	LEVEL	GRADE
<u>ANTIMUSCARINICS</u>		
Tolterodine	1	A
Trospium	1	A
Solifenacin	1	A
Fesoterodine	1	A
Darifenacin	1	A
<u>MIXED ACTIONS</u>		
Oxybutinin	1	A
Propiverine	1	A
Flavoxate	2	

Table 9. Antimuscarinics most commonly used in the incontinent frail elderly

9.2.2 Desmopresin

Desmopresin is a synthetic vasopressin analogue, with strong anti-diuretic effects. It could be very useful in the treatment of nocturia, but with risk of hyponatremia (between 7.6 to 10%), especially in the frail elderly patients. In addition, desmopresin should not be used in frail elderly due to the high risk of hyponatremia (level 1 of evidence) (DuBeau et al, 2010; Abrams et al; 2010).

9.2.3 Duloxetine

Duloxetine is a relative recent drug, which is useful for moderate to severe stress urinary incontinence. It has a good profile with a positive effect since the start of the treatment. Its side effects are infrequent (with mild or moderate severity), and of a short duration. Nowadays it is considered as a good alternative for the surgery of stress urinary incontinence in older females (Robinson & Cardozo, 2010).

9.2.4 Alpha-blockers

Other interesting type of drug is the group of alpha-blockers, especially in men with storage lower urinary tract symptoms and urgency, however, they should be used with caution in the frailest men due to the hemodynamic adverse effects (Schröder et al, 2009; Verdejo, 2011).

9.2.5 Catheterisation

Unfortunately, in the cases of chronic urinary retention or bladder impaired contractility in which the patient keeps a high PVR, should be considered the insertion of an urethral catheter. Intermittent catheterisation is usually safer and effective but obviously requires the patient or the carers to be able to learn and practice this technique. When intermittent catheterisation can not be possible, urethral catheter should be considered, with the secondary risks of this technique (infection, hematuria, urethral trauma, accidental removal) (Thirugnanasothy, 2010).

The main indications for long term indwelling catheterisation are exposed in the table 10.

<b>Chronic bladder outlet obstruction and surgery is not appropriate</b> <b>Patients or carers are unable to manage intermittent catheterisation</b> <b>Patients with pressure sores (transient indication)</b> <b>Patients severely affected by the leakages</b> <b>Managing incontinence in end of life situations</b>
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Table 10. Main recommendations for using a long term indwelling catheter:

9.3 Surgical procedures

In the last years the development of surgical procedures has been very important, especially for repairing stress incontinence. Nowadays, we can obtain good results with several techniques (Way, 2009):

- The injection of bulking agents: it is a useful alternative in women with stress incontinence who have high comorbidity and high surgical risk.
- Vaginal pessaries: for treating older women with moderate or severe prolapse and with an average patient satisfaction about 50% at 12 months
- Neuromodulation (through sacral or percutaneous tibial nerve stimulation): that produces a neuromodulation at S2-S4, improving the urinary urgency, frequency and incontinence (it can be performed via a fine needle inserted percutaneously near the ankle).
- Sling procedures: well the Tension-Free Vaginal Tape (TVT) procedure (introduced in 1996) or the Trans-Obturator Tension-Free Vaginal Tape (TOT) procedure (in the year 2001 this technique was modified due a less invasive procedure with a low risk of bladder damage).
- I would like to highlight the role of Botulinum toxin because its use is increasing for patients with refractory symptoms to other treatments due to overactive bladder, with neurogenic (Grade A) as well as idiopathic type (Grade B). The technique consists in the injection of botulinum toxin by cystoscopy into the detrusor muscle. The clinical results are good, but with problems such as urinary retention and urinary tract infections. Careful and individualized patient selection is very important to ensure satisfactory response (Duthie et al, 2007; Verdejo, 2011).

10. Key points in the care of the incontinent frail elderly

- Urinary incontinence supposes the loss of a basic function, which is most prevalent in the frail and disabled elderly, and it is associated with a lot of problems.

- The frail older population have a high risk of suffer urinary incontinence, related to their medical conditions, the use of polypharmacy and the functional impairment.
- The impact on Quality of Life is very high, similar as produced by Diabetes Mellitus, Stroke or Arthritis.
- Unfortunately, and in contrast with this reality, the index consultation for UI is low, as well as the number of elderly people that received an effective treatment, in spite of the valid alternatives.
- Several conservative alternatives to manage incontinent elderly patients, including the frailest ones, are available and with high rates of effectiveness.
- Medical treatments are available (antimuscarinic drugs, duloxetine, desmopresin), and should be used knowing their characteristics and limits.
- Older patients who should be referred for further evaluation and treatment need to be identified.
- Efforts are needed to improve research in different areas, especially those related to incontinent frail elderly patients.

## 11. Acknowledgements

I am indebted to Dr. David Castro for his critical review and helpful suggestions.

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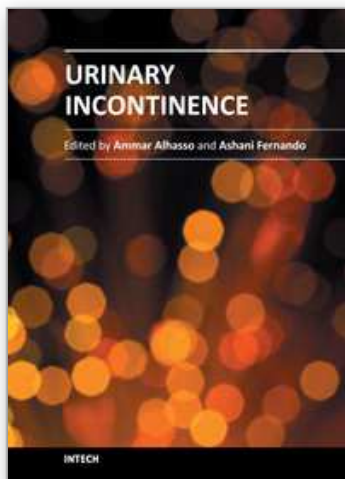
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Edited by Mr. Ammar Alhasso

ISBN 978-953-51-0484-1

Hard cover, 324 pages

**Publisher** InTech

**Published online** 04, April, 2012

**Published in print edition** April, 2012

Management strategies are framed within a multidisciplinary team structure and as such a range of specialists ranging from psychologists, specialist nurses, gynaecologists and urologists author the chapters. There are some novel methods outlined by the authors with their clinical application and utility described in detail, along with exhaustive research on epidemiology, which is particularly relevant in planning for the future.

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Verdejo-Bravo Carlos (2012). Geriatric Urinary Incontinence - Special Concerns on the Frail Elderly, Urinary Incontinence, Mr. Ammar Alhasso (Ed.), ISBN: 978-953-51-0484-1, InTech, Available from: <http://www.intechopen.com/books/urinary-incontinence/geriatric-urinary-incontinence-special-concerns-on-the-frail-elderly->

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